CLAIMS

032 I claim:

033 1. A remote illumination system has been created comprising:

a light source;

an optical light pipe for transporting light flux from said light source;

a tapered light guide that couples the light flux form the transporting light pipe to a light emitting luminaire;

a lighting luminaire for delivering and emitting light from said light source and light flux transportation system to a desired region, the luminaire being optically connected to said light source.

034 2. A lighting luminaire device as stated in claim 1 has been created by casting or machining at least one irregular tapered tetrahedron light guide into a flat rectangular plastic or glass panel.

(a) That the surface of the embedded light guide is abraded, etched and/or treated to affect light refraction on the bounty between the base panel material and the imbedded light guide. That the light guide (s) has a progressively larger cross sectional area and increasing surface area as it lays more distal to the light injection edge. That light flux is organized and injected into the emitting region of the luminaire via a flux organizational light guide section into at least one edge of the light panel and causing the light flux entering the emitting region to be organized and evenly distributed across the light injection edge of the luminaire emitted in a uniform fashion across the light panel:

(b) providing at least one elongated imbedded tapered light guide having a surface so structured with respect to the base panel thereof as to enable said light guide to transmit light along the light guide while said periphery prevents substantial emanation of light from said light guide in a direction transverse to said light guide;

(c) modifying a portion of said periphery over an extraction zone of said light guide to impart a generally tapered irregular tetrahedron shape to said zone extending continuously from a cross sectionally small end to a cross sectionally large end thereof and so that light traveling through said core in a propagation direction from said small end to said large end will emanate in an emanation direction transversely to said propagation direction, said zone narrowing in width in a spreading direction transversely to said propagation direction and to said emanation direction whereby an area exposed to said light emanating from said light guide is illuminated continuously along said length of said zone; and

(d) injecting light into said light guide ahead of said narrow end so that the light propagates in said propagation direction whereby said area is illuminated.

035 3. The method defined in claim 2 whereby said light guide is machined or cast into the base panel material of plastic or glass and said light guide is generally an irregular tetrahedron having an increased surface area as it lays distally to the light injection edge.

(a) The surface of the embedded light guide may have additional smaller surfaces within the general irregular tetrahedron shape to provide more surface area of light emission.

(b) The method defined in claim 2, further comprising the step of rendering a surface of said light guide which is exposed over said zone diffusively light emissive.

(c) The method defined in claim 2 wherein said surface is rendered diffusively light emissive by abrading said surface.

(d) The method defined in claim 2 wherein said surface is rendered diffusively light emissive by coating said surface.

(e) The method defined in claim 2 wherein said surface is rendered diffusively light emissive by chemically treating said surface.

036 4. A device that provides illumination from a remote light source via a transporting light pipe by injecting light flux into at least one edge of the light emitting panel from the edge that is perpendicular the small end of the embedded light guides.

(a) That the light flux is injected parallel to the light guides.

(b) The light flux is injected via a tapered light pipe area optically attached or part of the base panel material. That this tapered light injection area is of sufficient length to preserve the light source radiant flux density over the area of the light injecting edge of the light panel. The tapered light pipe injector provides angular averaging of the input light flux and provides a method of traversing the input light flux from the transporting light pipe while maintaining the etendue from the transporting light pipe.

(c) The tapered light pipe injector is an integral part of the light panel system as it provides a coupling area to provide a uniform light flux from a light supply pipe of one shape and size attached to a light source and the light panel of another shape and size.

(d) The tapered light pipe injector has one end that is the shape and size of the light flux transporting light pipe and the other end that is the shape of the light panel.

(e) The tapered light pipe injector area organizes the light flux in a uniform manner across its coupling area and eliminates high light intensity areas ("hot spots") at the light

input end of the light panel.

(f) The tapered light pipe injector may be bent over a radius of 10 times its ½ thickness or greater.

037 5. The luminaire is specifically designed to provide general or task lighting in any application that would normally use a fluorescent, filament or arc type light bulb without the inherent limitations of usual light sources such as space requirements, heat generation, environmental temperature, moisture sensitivity, possible explosive ignition and/or crush or explosion due to hypo or hyper baric pressures.

(a) The ambient operating moisture, chemical and/or temperatures of the luminairs are only limited by the properties of the base plastic or glass materials used.

(b) No heat is generated from the luminaire and can be used in explosive environments.

(c) The luminaire is fashioned from a solid plastic or glass panel and is unaffected by operating pressures. The luminaire could operate in extreme hypo and hyper baric conditions without exploding or crushing.

(d) The luminaire can be fashioned to fit into existing or new "T" grid drop ceilings for use in residential or commercial office lighting.

(e) The luminaire could be permanently sealed into place in clean room air plenums and do not require removal for servicing as there are serviceable parts.

(f) The luminaire has no replaceable parts and is ideally suited for areas that are inaccessible or where access would create a problem such as back lit billboards. The light emitting surface can be manufactured in very large sections and would be ideally suited for any large exterior back lit signage. The emitting surface could be etched, painted, silk screened or laminated with normal signage materials.

038 6. The luminaire can be surface mounted or hung.

039 7. The light source is remote from the subject luminaire.

(a) The heat generated from the light source could be discarded to lower air conditioning requirements or recycled to provide heat for other uses.

(b) Access to the interior of the light emitting panel is not required for maintenance.

(c) The light emitting panel can be used in explosive atmospheres.

(d) The light panel can be used in caustic atmospheres.

(e) The light emitting panel is unaffected by atmospheric or ambient pressure or pressure changes.

040 8. The light panel service temperature is only defined by the materials that it is composed of.

(a) Using alternate base materials with the same inherent optical properties can extend the service temperatures to the extremes found in outer space.